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ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST,

CAMBODIA, LAOS, THAILAND AND VIET-NAM

Committee for Co-ordination of Investigations
of the Lower Mekong Basin

REQUEST TO UNITED NATIONS SPECIAL FUND

for

Assistance in the preparation of an amplified basin plan

A. SUMMARY

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4. Time-table of the project

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COMMITTEE FOR COORDINATION OF INVESTIGATIONS OF THE LOWER MEKONG BASIN

(Cambodia, Laos, Thailand and the Republic of Viet-Nam)

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A. SUMMARY

1. On behalf of the Governments of Cambodia, Laos, Thailand and the Republic of Viet-Nam the Committee for Coordination of Investigations of the Lower Mekong Basin in this present request seeks the assistance of the Special Fund to aid it in its preparation of an amplified river basin plan for the development of water resources in the lower Mekong basin.

2. The Committee for Coordination of Investigations of the Lower Mekong Basin was established by the Governments of Cambodia, Laos, Thailand and the Republic of Viet-Nam in October 1957. It consists of plenipotentiary representatives of these four governments and is authorized to promote, co-ordinate, supervise and control the planning and investigation of water resources development projects in the lower Mekong basin. To these ends, the Committee was authorized to prepare and submit to participating governments plans for carrying out co-ordinated research, study and investigations as well as to make requests for financial and technical assistance and to administer such assistance. Since early 1959, the Committee has, with the assistance of many cooperating countries and UN agencies, engaged in a very extensive programme of data collection and has taken up

/the preparation

the preparation of comprehensive feasibility reports for three projects in the main river, and six projects in the tributaries. The Committee also completed the reconnaissance of the major tributaries and started a programme for the improvement of navigation.

3. Now in the fourth year of operation (1962), the Committee believes that it has assembled sufficient data to amplify the preliminary basin plan prepared for its consideration in 1957 by UNECAFE. The Committee needs to amplify this preliminary plan to provide itself with a more thorough analysis (based on the now greatly increased data) of the potentialities of the river system, of the inter-relation of the individual multiple-purpose projects with each other, and of the optimum combination of a system of projects that would yield the most beneficial result. The amplified plan will also serve the Committee as a more useful guide in the coordinating of the preparation of comprehensive feasibility report for individual projects now under way.

4. The basic ingredients in the basin plan are the individual multiple purpose projects in mainstream and in the major tributaries. The first phase of work will consist of the preparation of preliminary plans for each of the projects, including the filling of gaps in the Committee's programme of field data collection. This work can be entrusted to a competent consulting engineering firm or firms and will take a period of about two years. Each of the preliminary plans will contain a rough layout of the project, and a preliminary design of the dam and structures for different scale of development, together with a reasonable estimate of costs and benefits.

5. The coordination and integration of the individual projects into a basin plan is to be done by the Committee in the third year. An extensive analysis will be made of the inter-relation of the projects, the various combination of projects and the different sequence of development of projects in a system with a view to obtaining an optimum plan of development. This planning work, to be completed in about one year's time, is to be carried out by

/a combined team

a combined team of experts comprising of consultants to be provided by the Special Fund, engineering staff of the Committee and engineering staff of the Bureau of Flood Control and Water Resources Development of UNECAFE. Paralleling this the Committee also recommends that the United Nations serves as Executing Agency for its project; and within the United Nations, with UNECAFE carrying out the substantive responsibilities of the Executing Agency. The combined team is to be assisted by counterpart engineers from the four riparian countries with adequate supporting service in computation, drafting and secretarial work. The combined team, under the guidance of the Committee's Executive Agent and technical supervision of its Senior Engineering Consultant, should work in closest cooperation with various teams of the cooperating governments and agencies participating in the different projects on the Mekong.

6. The total cost of the entire project is estimated at $3,053,200 of which the Special Fund is requested to provide a sum of $1,821,000 and the balance, amounting to $1,232,200 is to be borned by the governments.

B. BACKGROUND

7. The Committee for Coordination of Investigation of the Lower Mekong Basin was established by the governments of Cambodia, Laos, Thailand and the Republic of Viet-Nam in October 1957 in response to the decision taken by the United Nations Economic Commission for Asia and the Far East at its thirteenth session (March 1957). The functions of the Committee are to promote, co-ordinate, supervise and control the planning and investigation of water resources development projects in the lower Mekong basin. To these ends the Committee may:-

(a) prepare and submit to participating governments, plans for carrying out co-ordinated research, study and investigation;

/(b) make requests

(b) make requests on behalf of the participating governments for special financial and technical assistance and receive and administer separately such financial and technical assistance as may be offered under the technical assistance programme of the United Nations, the specialized agencies and friendly governments;

(c) draw up and recommend to participating governments criteria for the use of the water of the main river for the purpose of water resources development.

8. The first skeleton plan for the development of water resources in the lower Mekong basin is contained in the study[1] "Development of Water Resources in the Lower Mekong Basin" produced in 1957 by the United Nations ECAFE Bureau of Flood Control and Water Resources Development. The study deals with the development of a series of multiple-purpose projects in the main river and the Committee assigned top priority to three of them. Subsequently, a United Nations Survey Mission prepared for the Committee in early 1958 a five-year programme of studies and investigations[2] dealing with the collection of basic data in the main stream as well as in the major tributaries. The Mission also recommended that, as soon as sufficient engineering data became available, a skeleton basin plan be prepared to include not only projects in the main stream, but also projects in the major tributaries. It was suggested that, if resources were available for data collection, the preparation of a skeleton basin plan should begin at the fifth year of the data collection programme.

9. Concurrently with the collection of basic data, reconnaissance of the major tributaries were undertaken at the request of the Committee by a team

/of Japanese experts.

1/ United Nations: "Development of Water Resources in the Lower Mekong Basin", UN Publication (Sales No. 1957.II.F.8).

2/ United Nations Survey Mission: Programme of studies and investigations for comprehensive development of the Lower Mekong Basin, January 1958 (TAA/AFE/3).

of Japanese experts. In its final report[1] submitted to the Committee, the team presented preliminary plans for the development of many promising sites in the major tributaries, which, together with basic data then available, added considerable information to development possibilities in the basin. With such new information and data available, the Committee therefore authorized the Bureau of Flood Control and Water Resources Development to undertake this task of revising the basin plan which it originally prepared in 1957 with such outside assistance as was required in securing additional data and with the understanding that the determination of priorities of projects rests with the Committee.[2]

10. In a report[3] prepared for the Committee in 1962 by a mission under the leadership of G. White dealing with "Economic and Social Aspects of Lower Mekong Development", the White Mission recommended, inter alia, the initiation of studies of scale and scope of the ultimate Mekong system by means of a programme for computer simulation of various alternative combinations of projects as well as varying scales within the combination. Such a programme can advantageously be included in the preparation of a basin plan.

11. The Committee feels that, with data already available or becoming available concerning basin hydrology, topography and with the knowledge gained from reconnaissance survey and preparation of feasibility reports of many individual projects, time is now opportune to begin the major task of amplification of its basin plan. This is a task requiring the combined efforts of talents to be drawn from various sources, from experts to be provided under Special Fund aid, from staff of the riparian countries, of the office of the Committee's Executive Agent and of the Bureau of Flood Control and Water Resources Development of the UNECAFE, many of them continuously associated with the development of the basin plan and the various projects in the basin.

1/ The Mekong Reconnaissance Team organized by the Government of Japan: "Comprehensive Reconnaissance Report on the Major Tributaries of the Lower Mekong Basin", Tokyo, September 1961.

2/ Committee for Coordination of Investigations of the Lower Mekong Basin: Annual Report to ECAFE, March 1961 - January 1962, (E/CN.11/577)

3/ G. White, E de Vries, H.B. Dunkerby and J.V. Krutilla; "Economic and Social aspects of Lower Mekong Development", January 1962.

C. THE PROJECT

1. Purpose

12. The purpose of the project is to prepare an amplified basin plan, or a master plan for the development of water resources in the Mekong basin for the generation of hydro-electric power, improvement of navigation, control of flooding, provision of irrigation, improvement of drainage and supply of water for domestic and industrial use. The amplified water plan will endeavour to ascertain, with a degree of accuracy as data permit: (1) the various scales of development of each of the major projects in the basin including an estimate of their costs and benefits for which the preparation of comprehensive feasibility reports has not been undertaken; (2) the inter-relation of the individual projects with each other; (3) the various combinations of projects and their costs and benefits for various scales of development; and (4) the optimum extent that water resources could be developed in the lower basin. Such a planning study should throw light on the most desirable scale and combination of projects. The plan should cover not only projects in the main river, but also projects in those major tributaries the development of which will affect, to a substantial degree, the regime of flow in the main river. It is also clearly understood that the determination of priority of projects and combination of projects rests with the Committee.

13. The present project, dealing essentially with the development of water projects, will take into consideration, in a generalized manner, other aspects of economic development such as industry, agriculture, power market and transport that are intimately related to water projects. The Committee is concurrently engaged in the preparation of comprehensive feasibility reports of a few projects and believes that intensive coordination with other sectors will have to be done project-wise, taking into consideration the needs of area to be served by each project. Such coordination, requiring cooperation of many national agencies and to be organized at a later date, is not included in the scope of the present request.

/2. Description

2. Description

14. The basic ingredients in the basin plan are the individual multiple purpose projects in the main stream and in the major tributaries. The first phase of work will consist of the preparation of preliminary plan for each of the individual projects, including the collection of additional hydrologic, topographic, geologic and other data required for preliminary planning of the projects. Such work can best be entrusted to a competent engineering firm or firms and is estimated to be completed in two years time.

15. The coordination and integration of the individual projects into a basin plan is to be initiated toward the end of the second year and to be completed in the third year. This work will be carried out by a combined team of experts from the Special Fund, the Committee's office of the Executive Agent and the Bureau of Flood Control and Water Resources Development of the United Nations Economic Commission for Asia and the Far East, with counterpart personnel from the four governments.

(a) Projects to be included in the basin plan

16. The present plan envisaged the inclusion of 13 projects on the main stream and 15 projects on 13 major tributaries. These projects are listed in table 1. As more data becomes available during the planning, it may be necessary to make certain alterations to the number and location of projects.

/Table 1

Table 1

List of projects to be included in the basin plan

(1) Mainstream projects

	Project	Approximate distance from Burma-Thai border (kilometres)	Purpose 1/	Remarks
1.	Pak Beng	245	P.F.N.	
2.	Luang Prabang, Upper	356	P.N.	
3.	Luang Prabang, Lower	462	P.W.	
4.	Pa Mong	808	P.F.N.I.	Feasibility report under preparation
5.	Bung Kan	1,010	P.N.	
6.	Thakhek	1,190	P.N.	
7.	Khemarat	1,400	P.N.	
8.	Pakse	1,740	P.N.	
9.	Khone	1,700	P.N.	
10.	Stung Treng	1,758	P.F.N.I.	
11.	Sambor	1,885	P.N.I.	- do -
12.	Tonle Sap	2,135	F.N.I.D.	- do -
13.	Deltaic area	2,100-2,530	F.I.D.	

(2) Tributary projects that will substantially affect the regime of the mainstream

	Tributary	Country	Purpose	Remarks
1.	Nam Ngum incl. Nam Lik	Laos	P.F.I.	Feasibility report under preparation for N. Ngum
2.	Nam Theun	Laos	P.	
3.	Se Bang Fai	Laos	P.F.I.	
4.	Se Bang Hieng	Laos	P.F.I.	
5.	Se Done	Laos	P.I.	
6.	Se Kong	Cambodia/Laos	P.F.I.	
7.	Nam Munn including	Thailand		
	(a) Nam Pong		P.F.I.	Feasibility report already prepared
	(b) Nam Mong		P.I.	
8.	Nam Cam	Thailand	P.I.	Feasibility report under preparation
9.	Se San	Cambodia/Viet-Nam	P.F.I.	- do -
10.	Sre Pok	Cambodia/Viet-Nam	P.F.I.	
11.	Stung Sen	Cambodia	P.N.F.I.	
12.	Stung Battambang	Cambodia	P.I.	- do -
13.	Prek Khnot	Cambodia	P.I.	- do -

1/ P = Power; F = Flood control; N = Navigation; I = Irrigation; D = Drainage

17. Among the projects listed in table 1, comprehensive feasibility reports are being prepared for 3 of the 13 projects on the mainstream and 6 (with one already completed) of 15 projects on the major tributaries. Therefore, the present programme contemplates only the preparation of preliminary plan for each of the rest of the projects on the basis of which an amplified basin plan is to be formulated.

(b) Preparation of preliminary plan for individual projects

18. The preliminary plan for each individual project will include a preliminary layout of the project, together with alternative where appropriate. The plan will include a preliminary design of the dam and major structures, for various practical scales of development. A reasonable estimate will be made of the benefits to be derived and cost involved for various scales of development, to be used later in the system analysis in the preparation of the basin plan.

19. The general layout of the project including the reservoir area will be made with the help of 1:20,000 topographic map, available for many of the sites. Additional mapping of the same scale will be required for one project in the main stream and several in the tributaries. Detailed topographic mapping at a scale of 1:2,000 together with soundings of the river channel will be required for all sites, together with a detailed geological investigation. If it deemed necessary, one or a few borings will be made at a few sites to ascertain the elevation of sound foundation. The investigations will also include general hydro-meteorological studies, survey of construction material, reconnaissance survey of the soil and land capability of the prospective irrigable area, general survey of power market and the collection of data required for the assessment of costs and benefits.

20. The Committee will supply hydrological and meteorological data essential for preliminary planning and, for this purpose, the Committee will assume the responsibility in the operation of a network of stations during the period of this project. However, a few temporary stream gauging stations will have to be added and the cost of equipments for such new stations is included in the present request.

/21. The Committee

1/ Also supplementary mapping of other sites if necessary

21. The Committee believes that the task of the preparation of preliminary plan of the individual projects including the collection of additional topographic, geologic, soil, and other data can best be entrusted to a competent engineering firm or firms. The scope of work required for the preparation of preliminary plan for individual projects may be recapitulated as follows:-

(1) Collection of basic data

(i) Topographic mapping of the Stung Treng reservoir area in the main river(10,000 sq km) and other reservoir areas in the tributaries (5,000 sq km) at a scale of 1:20,000 with 5 metres contour.

(ii) Detailed mapping of 8 dam sites in the main river (100 sq km) and 11 sites in the major tributaries (50 sq km).

(iii) Establishment of 8 additional hydrologic stations on tributaries.

(2) Investigation and survey

(i) Preliminary geological investigation of 9 sites in the main river and 11 sites in the major tributaries, including necessary boring.

(ii) Construction material survey

(iii) Soil and land capability survey

(iv) Power market survey

22. The Committee will make available to the engineering firm or firms, under the Committee's programme of data collection, all data pertaining to planning. The office of the Executive Agent of the Committee and the Bureau of Flood Control and Water Resources Development of UNECAFE will prepare a list detailing the exact scope of work to be performed by the engineering firm for use as a specification for calling tender of service of engineering firm and to provide the firm with such hydrologic and other characteristic data required for planning of each individual project. In addition, a reserve will be included in this request to meet presently unforeseen gaps or inadequacies in data, survey and analysis.

(c) Preparation of an amplified basin plan

23. An amplified basin plan will be prepared toward the end of the second year of the project, after preliminary plans for each of the individual projects

/are ready.

are ready. The planning will be completed by the end of the third year. During the planning process, various combination of projects in the basin will be tried out for its total optimum output (in terms of power generated, volume of water available for irrigation, reduction of flood flow). The analysis will include combinations consisting of different number and arrangement of projects and will also include different scales of development of the individual projects and for various purposes to be served. The main objective of such an analysis is to ascertain the optimum system of development, as well as the optimum sequence of development of projects in a system.

24. Such an analysis will cover numerous combinations and can best be accomplished by means of high speed electronic digital computers. The computers required for this purpose will be available for rental in Bangkok in 1964, together with necessary services of programmer, programme analyst and operators.

25. In addition to an analysis of optimum system of combination of projects, the basin plan will also examine, in a general manner, the development of water resources as it is related to industry, agriculture, transport and power market supply and demand of areas in and adjacent to the basin.

26. The planning will be carried out by a combined team of experts consisting of (1) consultants to be provided under Special Fund aid specializing in different branches of basin planning, totalling 6 man-years[1/]; (2) existing engineering staff of the Office of the Committee's Executive Agent, totalling about 1½ man-years working part time on basin plan; and (3) existing engineering staff of the Bureau of Flood Control and Water Resources Development totalling about 3 man-years. The combined team will be assisted by counterpart engineers to be assigned by the riparian governments through the Committee, and with supporting service in computation, drafting and secretarial work. The planning team should cooperate closely, under the direction of the Executive Agent of the Committee and the technical supervision of its senior engineering consultant, with various teams of the cooperating countries and agencies participating in the Mekong development programme, in particular, with teams responsible for the preparation of comprehensive feasibility reports of projects in the main

1/ Including one professional assistant

/stream

stream as well as in the tributaries.

3. Summary of project requirements

27. Contractual services, experts, and equipments required for preparation of preliminary plan for individual projects including data collection and for the preparation of basin plan, to be provided by the Special Fund and the governments are separately summarized below:-

1. Preparation of preliminary plan for individual projects in the main stream and major tributaries (duration 2 years)

A. Contribution by the Special Fund

(1) Contractual services of engineering firm or firms

(i) Experts in the field and at home office totalled 42 man-years.

(ii) Topographic mapping of 15,000 sq km in a scale of 1:20,000 and 150 sq km in a scale 1:2,000.

(iii) Establishment of 8 additional hydrologic stations

(iv) Geological investigation of 9 sites in the main stream and 11 sites in the tributaries including boring

(v) Field investigations including construction material survey, soil and land capability survey, power market survey

(vi) Layout of project

(vii) Preliminary design of dam main structure

(viii) Estimate of costs and benefits

(ix) Preparation of preliminary planning report.

(2) Professional assistant to assist in project management 2 man-years.

B. Contribution by the governments

(i) Operation of the network of hydrologic stations in the lower Mekong basin and supply of hydrologic data

(ii) Supply of 1:20,000 topographic mapping along the main stem

(iii) Counterpart project managers 8 man-years

(iv) Local supporting staff 68 man-years

/(2) Preparation

(2) Preparation of basin plan (duration 1½ years)

A. Contribution by Special Fund

(i) Consultants in planning total	6 man-years
which include:	
1 planning engineer	1 man-year
1 expert on cost estimate	1 "
1 expert on system analysis	1 "
1 hydrologist	1 "
1 economist	1 "
1 professional assistant	1 "

(ii) Equipment and rental

Rental of IBM computers with programming and operating service including

1620 EDPM computer
1622 card read punch machine
421 accounting machine
024 punch card machine
056 verifier machine, and
1623 core storage

Equipment

2 Landrovers for inspection of field work

B. Contribution by governments

(i) Four counterpart managers	4 man-years
(ii) Supporting service including	
2 computers	2 man-years
2 draftsmen	2 "
2 secretaries	2 "

(iii) Operation and maintenance of landrovers

/C. Utilization

C. Utilization of existing staff of the Office of the Executive Agent

(i) Senior engineering consultant	1 man-year	(1963/64)[1/]
(ii) Hydrologist	½ "	(1963/64)[1/]

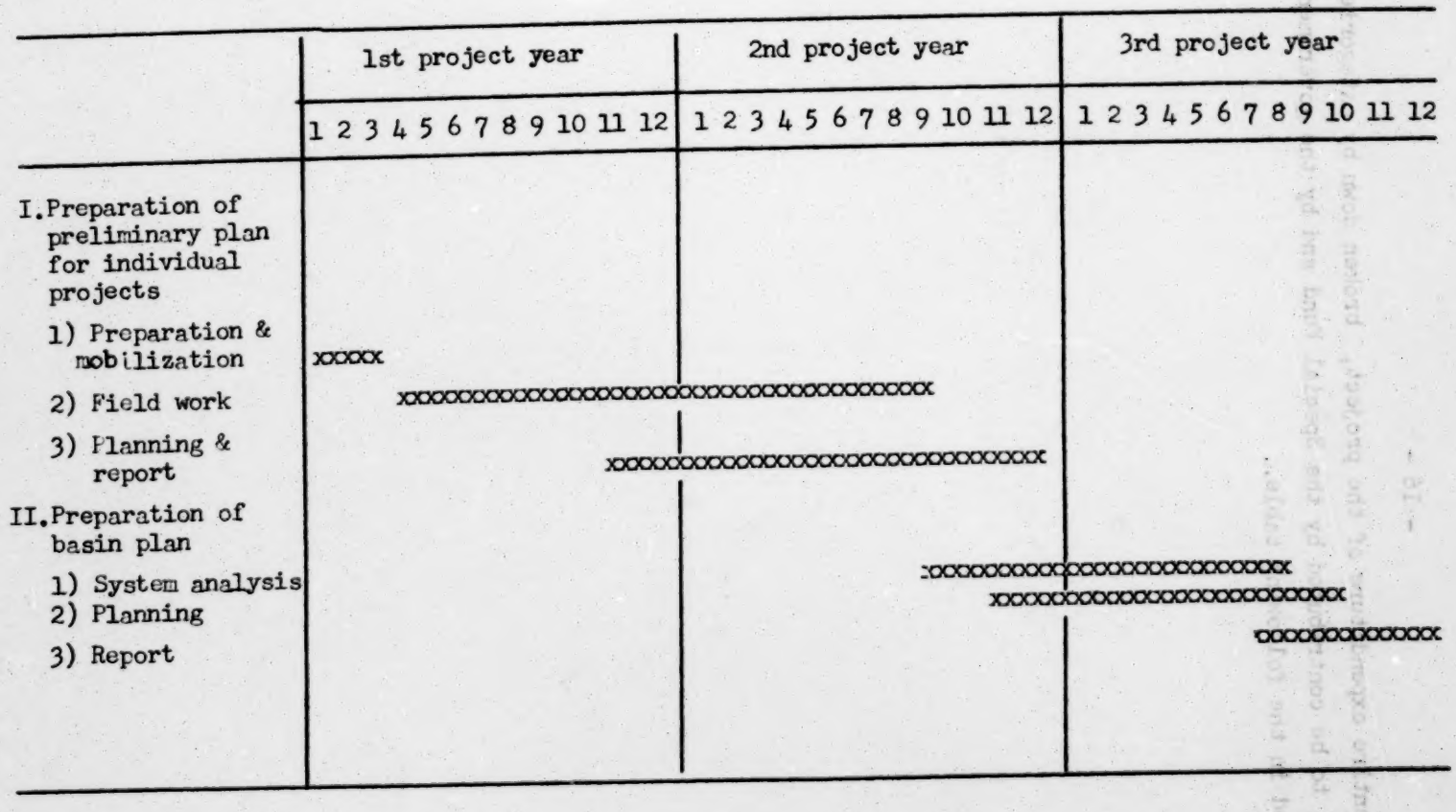
D. Utilization of existing staff of the Bureau of Flood Control and Water Resources Development

(i) Senior engineer	3 man-years

Time table

28. The time table, from the commencement of the work by the firm to the completion of the plan by a combined team, is given below. The total period of the entire project is estimated at 3 years, excluding time required for the preparation and specification, calling of tender and the award of contract to the engineering firm for the preparation of preliminary plan for individual projects.

1/ Plan of operation, survey of four tributaries (E/CN.11/WRD/MKG/P.29) paras.5, 10, 32, 35


1st project year
2nd project year
3rd project year
1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12
I. Preparation of preliminary plan for individual projects
1) Preparation & mobilization
2) Field work
3) Planning & report
II. Preparation of basin plan
1) System analysis
2) Planning
3) Report

29. The entire expenditure of the project, broken down by categories and by years, to be contributed by the Special Fund and by the governments, are summarized in the following table.

CATEGORY	1st year		2nd year		3rd year		Total	
	Special Fund	Governments	Special Fund	Governments	Special Fund	Governments	Special Fund	Governments
I. Preparation of preliminary plan for individual projects								
A. Project manager, experts and supporting staff								
(1) Full cost of experts in the field 22 man-years	210,000	31,500	120,000	18,000			330,000	49,500
(2) Full cost of experts and supporting staff at home office of firm 20 man-years	50,000		200,000				250,000	
(3) Local counterpart managers 8 man-years		10,000		10,000				20,000
(4) Local supporting staff in the field, interpreter, clerk, typist, driver labourers 68 man-years		40,000		28,000				68,000
(5) Professional assistant in management of project 2 man-years	14,000	2,100	14,000	2,100			28,000	4,200
B. Transportation of staff & equipment								
(1) Transportation of staff & equipment to and from home to project area	45,000		30,000				75,000	
(2) Transportation of staff and equipment within project area		6,000		4,000				10,000
C. Purchase, rental, depreciation, replacement, operation of equipment	350,000		100,000				450,000	
D. Engineering fee			100,000				100,000	
E. Overhead & general expenses								
(1) Home office including printing of maps & reports	60,000		100,000				160,000	
(2) Field office including furnitures, fixture		15,000		5,000				20,000
F. Reserve to meet presently unforeseen gaps & inadequacies in			200,000	30,000			200,000	30,000
II. Preparation of basin plan								
A. Collection of hydrologic data		323,000		323,000		323,000		969,000
B. Experts and supporting staff								
(1) Consultants in various field of planning including professional assistant 6 man-years			30,000	4,500	120,000	18,000	150,000	22,500
(2) Counterpart manager 4 man-years						10,000		10,000
(3) Supporting staff (computor, draftsman typist) 6 man-years						12,000		12,000
C. Inter-country travel			2,000	500	6,000	1,500	8,000	2,000
D. Equipment and rental								
(1) Rental of computer including service			20,000		30,000		50,000	
(2) Typewriter, ozalete printing, mechanic's drawing equipment					10,000	4,000	10,000	4,000
(3) 2 Landrovers, fuel, driver & maintenance	5,000	2,000		2,000		2,000	5,000	6,000
E. General expenses, including office furniture, fixture						5,000		5,000
F. Printing of planning report in English & French					5,000		5,000	
Total	794,000	429,600	916,000	427,100	171,000	375,500	1,821,000	1,232,200
						Grand total	3,053,200	